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# NASA TECH BRIEF

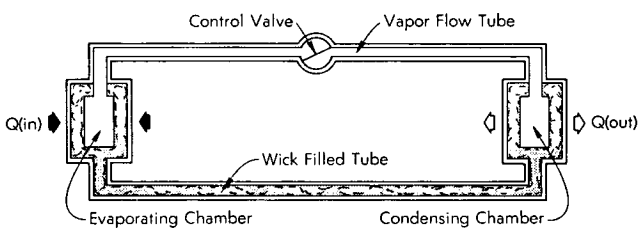
*Ames Research Center*



## Multichamber Controllable Heat Pipe

### The problem:

To control the rate of transfer of energy by a heat pipe.




### The solution:

Control the rate of transfer of vapor between the heat input surface and heat rejection surface of a heat pipe.

### How it's done:

The arrangement shown in the diagram makes use of the basic concept of conventional heat pipes. A snugly fitted wick saturated with a working fluid transfers liquid from the cold zone to the hot zone and does not permit passage of vapor. The transfer of vapor from the hot zone to the cold zone does not occur freely as it does in a conventional heat pipe; the transfer can be throttled or stopped altogether by means of a valve. Since heat transport in a heat pipe depends on vapor mass transfer, if mass transfer is stopped, heat pipe action will also stop. Throttling of the flow of vapor by the valve will result in a pressure differential between the hot zone and the cold zone and, therefore, will lead to an increased temperature difference between the corresponding regions within the heat pipe, for the condensation and evaporation temperatures of saturated vapor-fluid systems are a function of ambient pressure.

The valve controlling the flow of vapor is preferably operated by control signals such as may be generated by hydraulic, pneumatic, or electric controllers which sense temperatures (or pressures) in the hot or cold zone of the heat pipe or wherever temperature is to be controlled.

### Notes:

1. The following documentation may be obtained from:

   National Technical Information Service
   Springfield, Virginia 22151
   Single document price $3.00
   (or microfiche $0.95)

   Reference:
   NASA CR-1400 (N69-38491), Heat Pipe Devices for Space Suit Temperature Control.
2. No additional documentation is available. Specific questions, however, may be directed to:

   Technology Utilization Office
   Ames Research Center
   Moffett Field, California 94035
   Reference: B71-10526

### Patent status:

Title to this invention, covered by U.S. Patent No. 3,543,839, has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457(f)] to the TRW Systems Group, TRW, Inc., One Space Park, Redondo Beach, California.

(continued overleaf)

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